



NOAA Hydrometeorological TestBed at the NCEP Hydrometeorological Prediction Center (HPC)

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NCEP Vision: First Choice – First Alert – Preferred Partner



Introduction

- **Purpose**
 - Accelerate the assessment and implementation of new technology, research results, and other scientific advancements from the research and development communities to enhance HPC products and services
- **Funded through NCEP and NOAA HMT**
- **Staffing**
 - One full time contractor
 - One FTE 90%
 - Support from HPC DTB staff
- **Location**
 - Collocated with HPC operations





2009 Accomplishments

- Introduced rime factor tool to HPC forecasters
- Completed a comparison of the 1993 and 2008 Midwest floods
- Investigated predecessor rainfall events (PREs)



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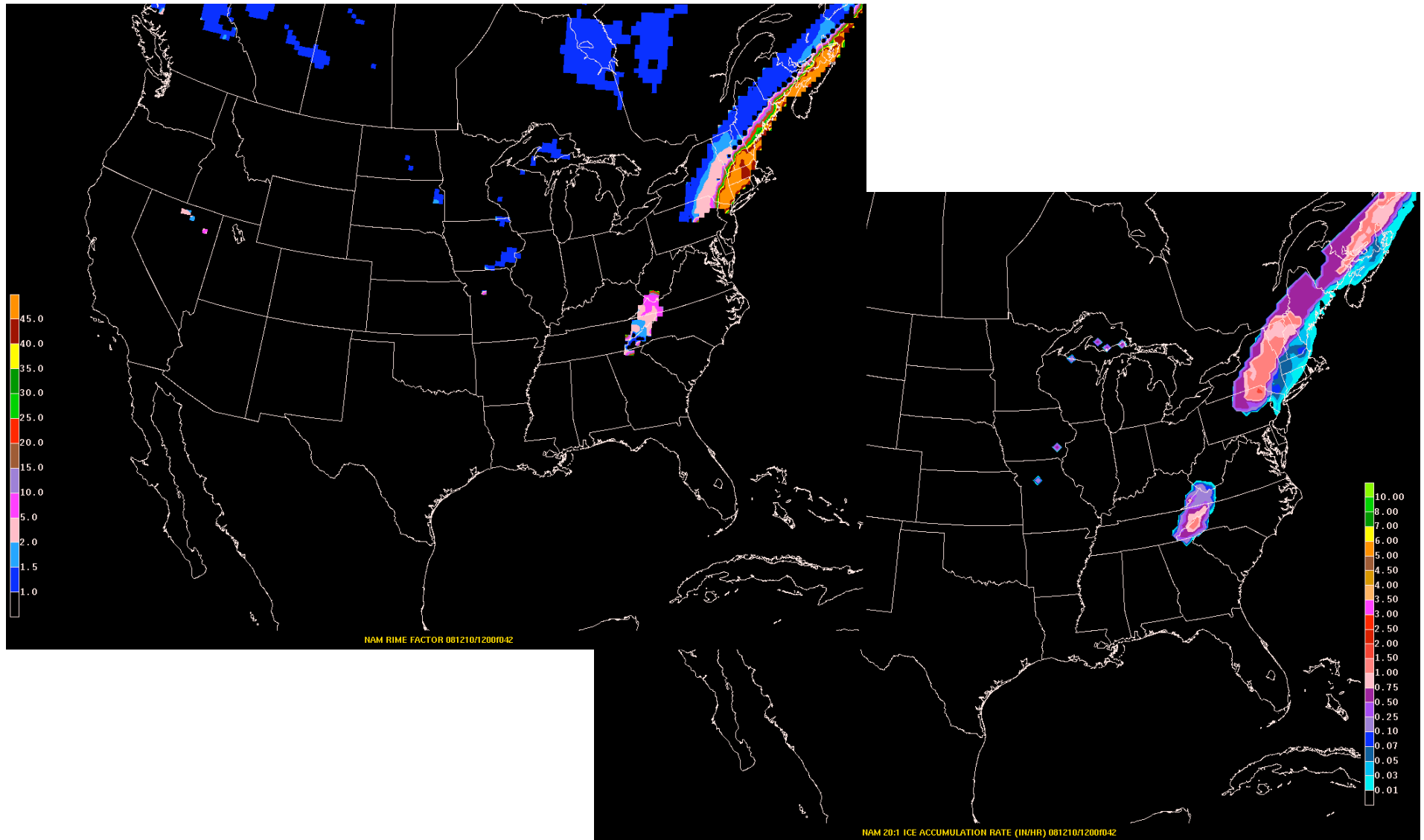
NAM Rime Factor

- **What is rime factor?**
 - Indicates amount of riming present on an individual ice particle
 - Values range from 1 (unrimed snow) to >40 (sleet)
 - Instantaneous output
- **Ice accumulation rate**
 - Derived from the rime factor based on an assumption of a maximum possible snow to liquid ratio
- **Available guidance**
 - Hourly rime factor and ice accumulation rate forecasts from 00Z and 12Z NAM
 - Estimated 6hr, 12hr, and 24hr total accumulations



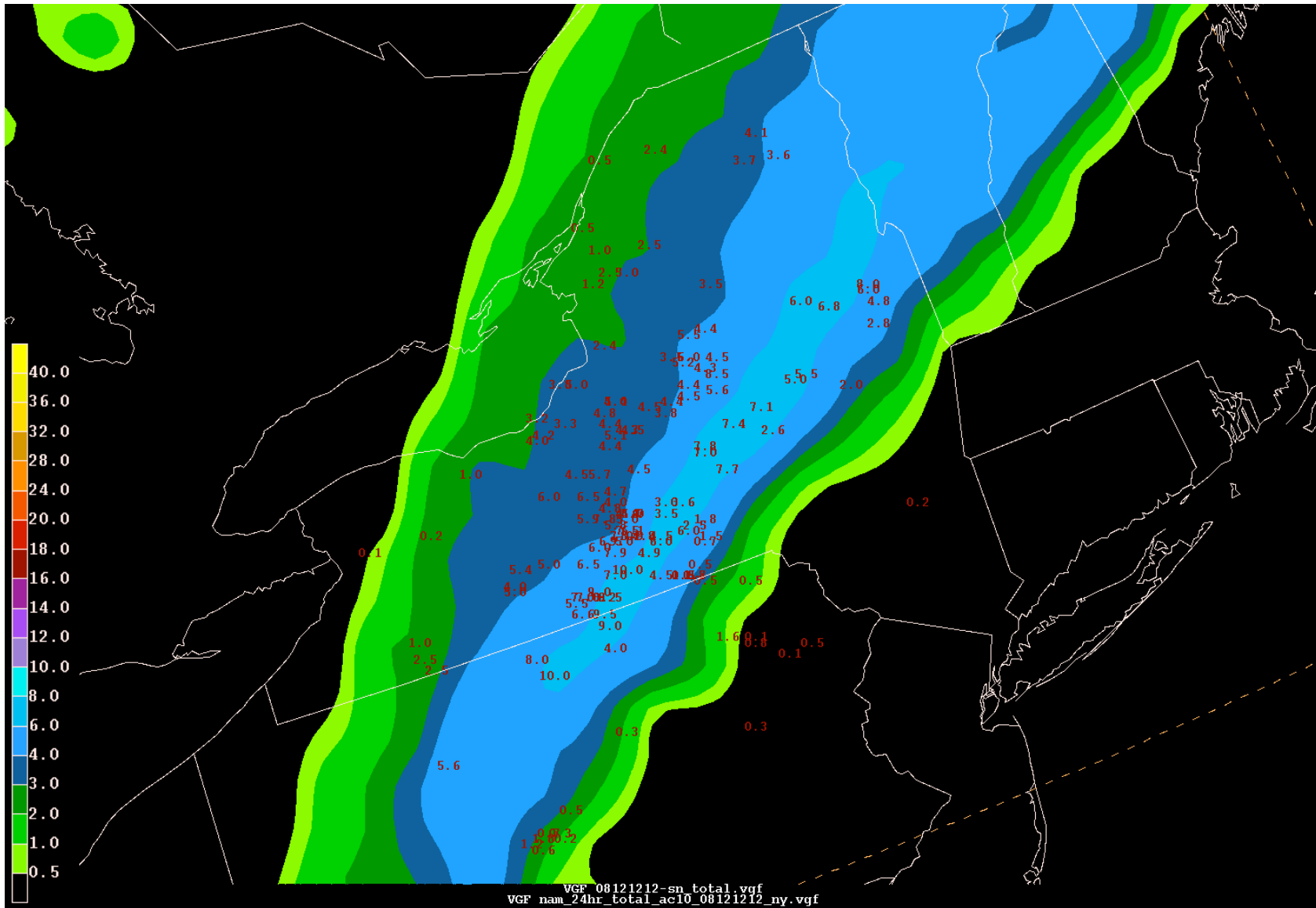


NAM Rime Factor Example



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NAM Rime Factor Example





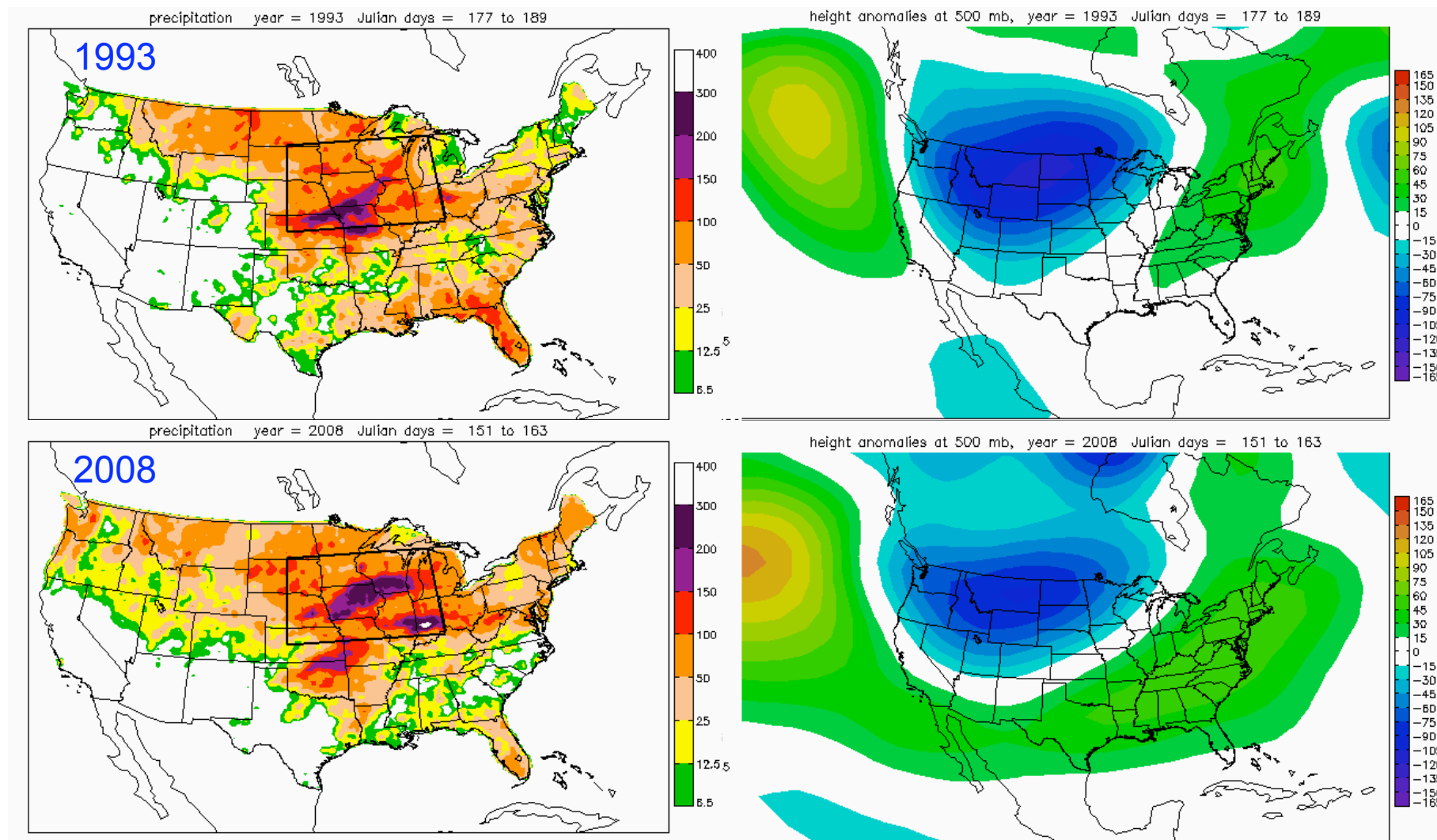
Midwest Floods

- **Rainfall during the 13 day periods of 29 June-11 July 1993 and 1-14 June 2008 resulted in severe flooding over the central US**
 - Represent the two wettest 13 day periods on record in the warm season based on a 60 year climatology
 - Both events preceded by a wet late winter/spring, resulting in high antecedent soil moisture
- **Events characterized by similar patterns in 500 hPa geopotential heights, 250 hPa winds, 850 hPa v-winds, and mean sea level pressure**
 - 0.939 correlation between 500 hPa height anomalies between events



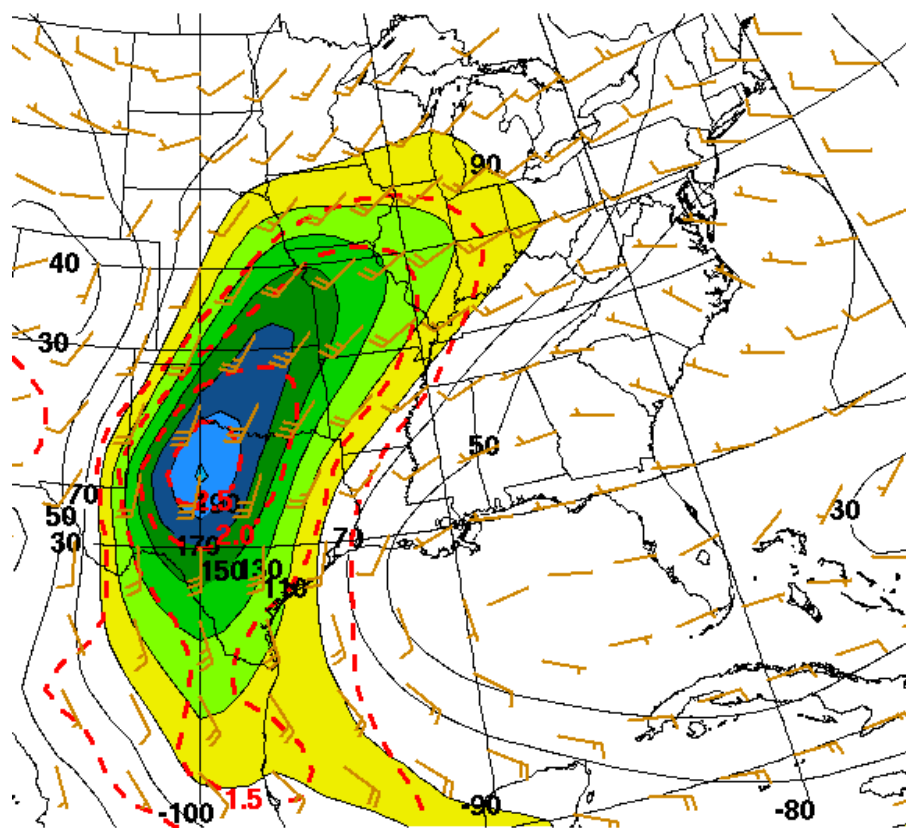
Midwest Floods

Precipitation and 500mb Height Anomalies

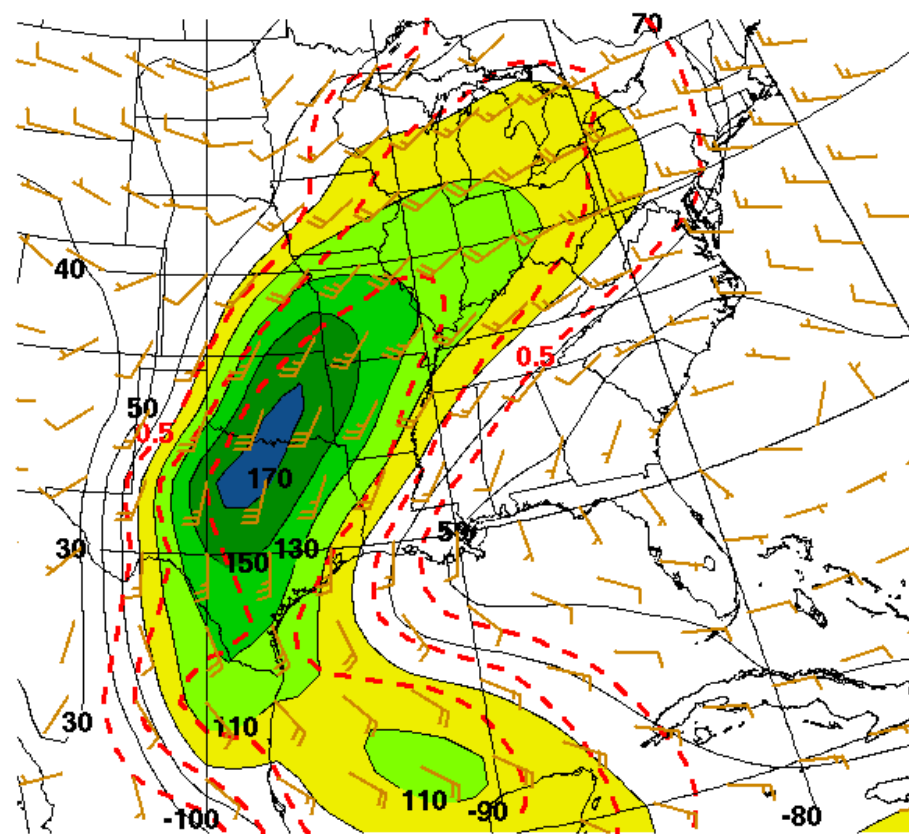
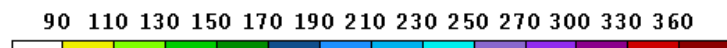


Midwest Floods

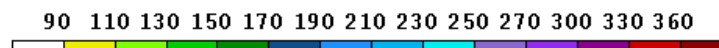
Moisture Flux



MOISTURE FLUX / STANDARDIZED ANOMALIES
JUNE 29 - JULY 11 1993

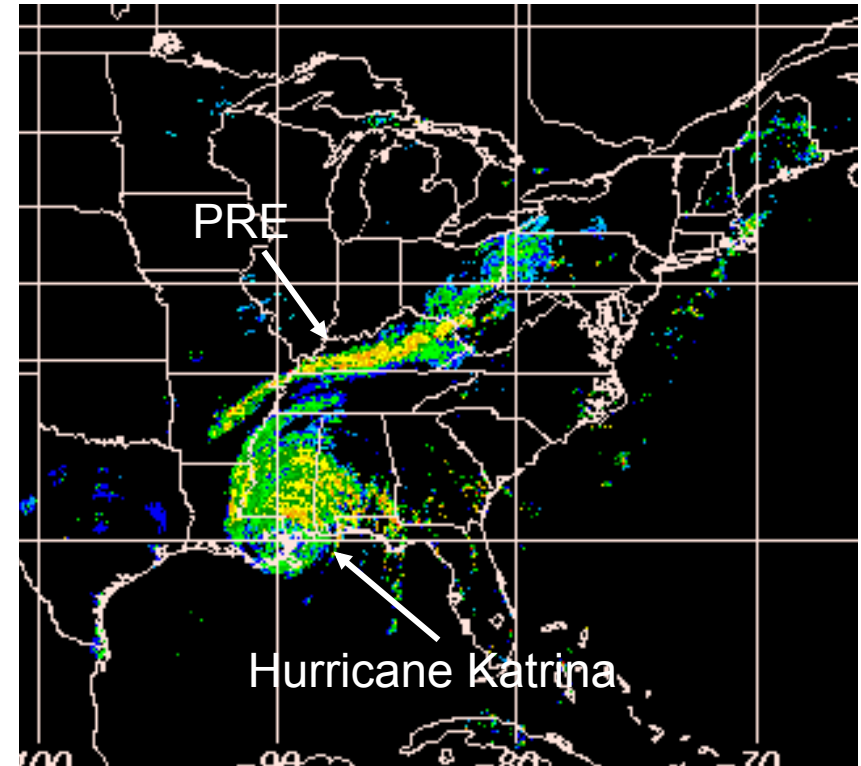


MOISTURE FLUX / STANDARDIZED ANOMALIES
JUNE 01 - JUNE 14 2008



Predecessor Rainfall Events (PREs)

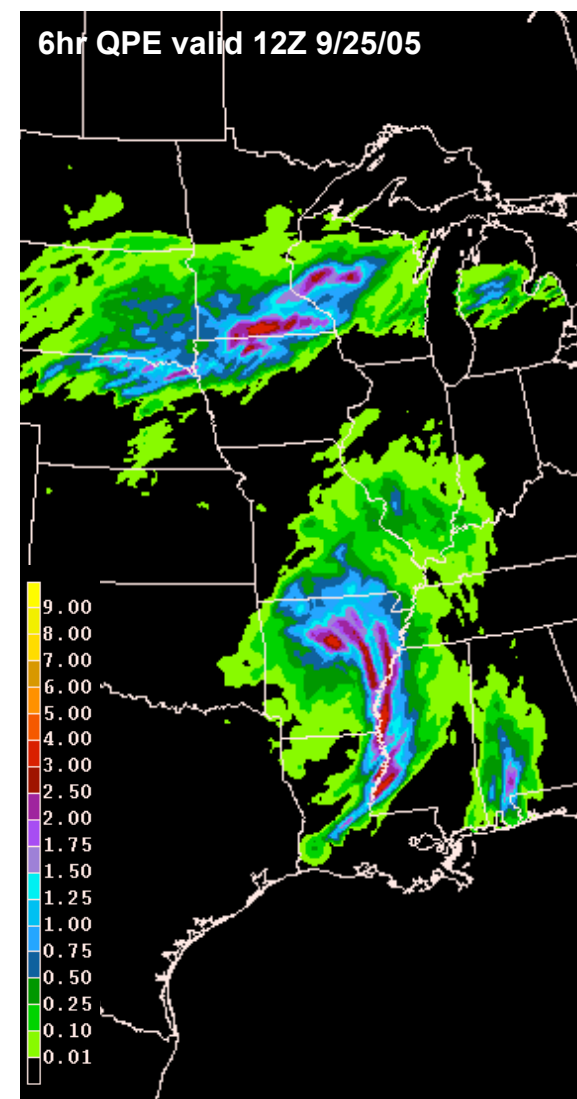
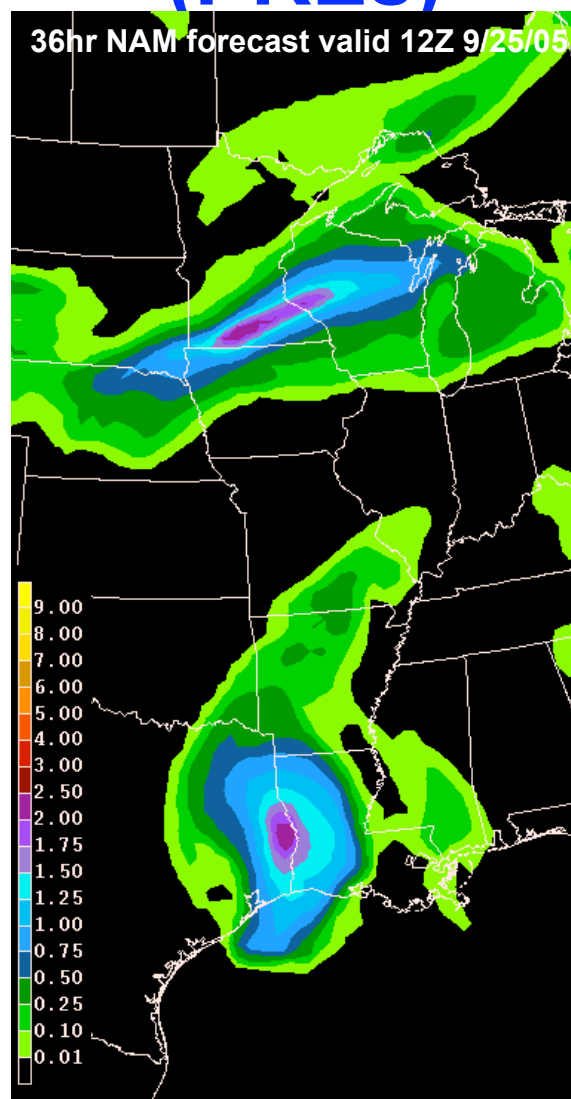
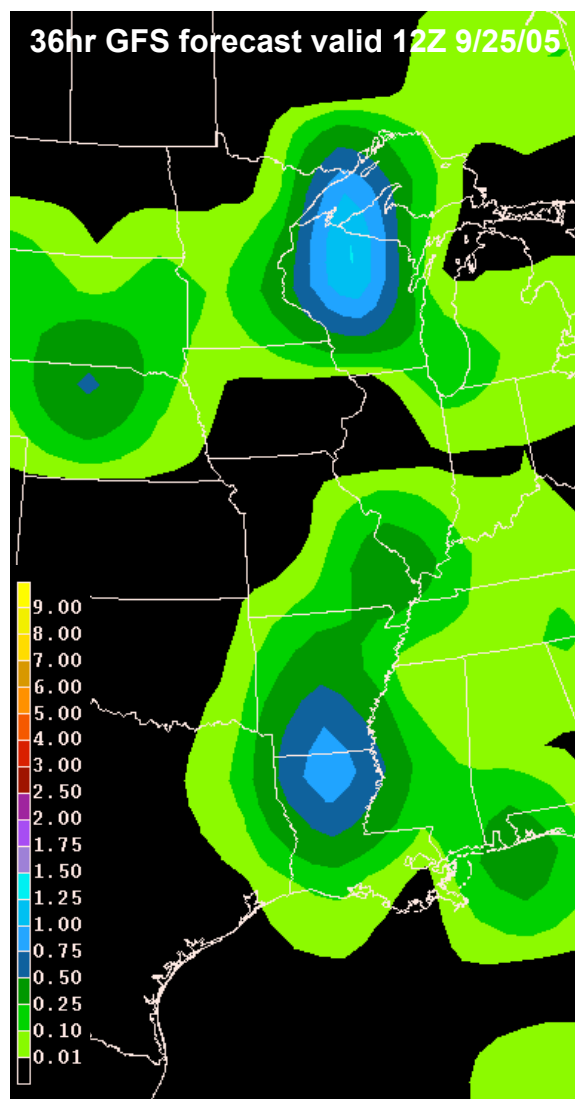
- Coherent area of rain located ahead of a tropical cyclone
 - Rainfall rates $> 100\text{mm}$ in 24hr
 - Moisture transport between tropical cyclone and PRE
- Represent an enhanced flooding risk
 - Bring heavy rain to areas outside the path of the tropical cyclone
 - Produce heavy precipitation in advance of the precipitation associated with the tropical cyclone





Predecessor Rainfall Events

(PREs)
Model Performance



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Current Projects

- **Object oriented verification (MODE)**
 - May provide information about model and forecaster biases in specific precipitation regimes
 - Output will be a component of the on-site HPC QPF experiment
- **HWT Spring Experiment—QPF component**
 - Goal—evaluate the use of high resolution model and ensemble data for QPF forecasting and identify the challenges associated with using this data





Questions?

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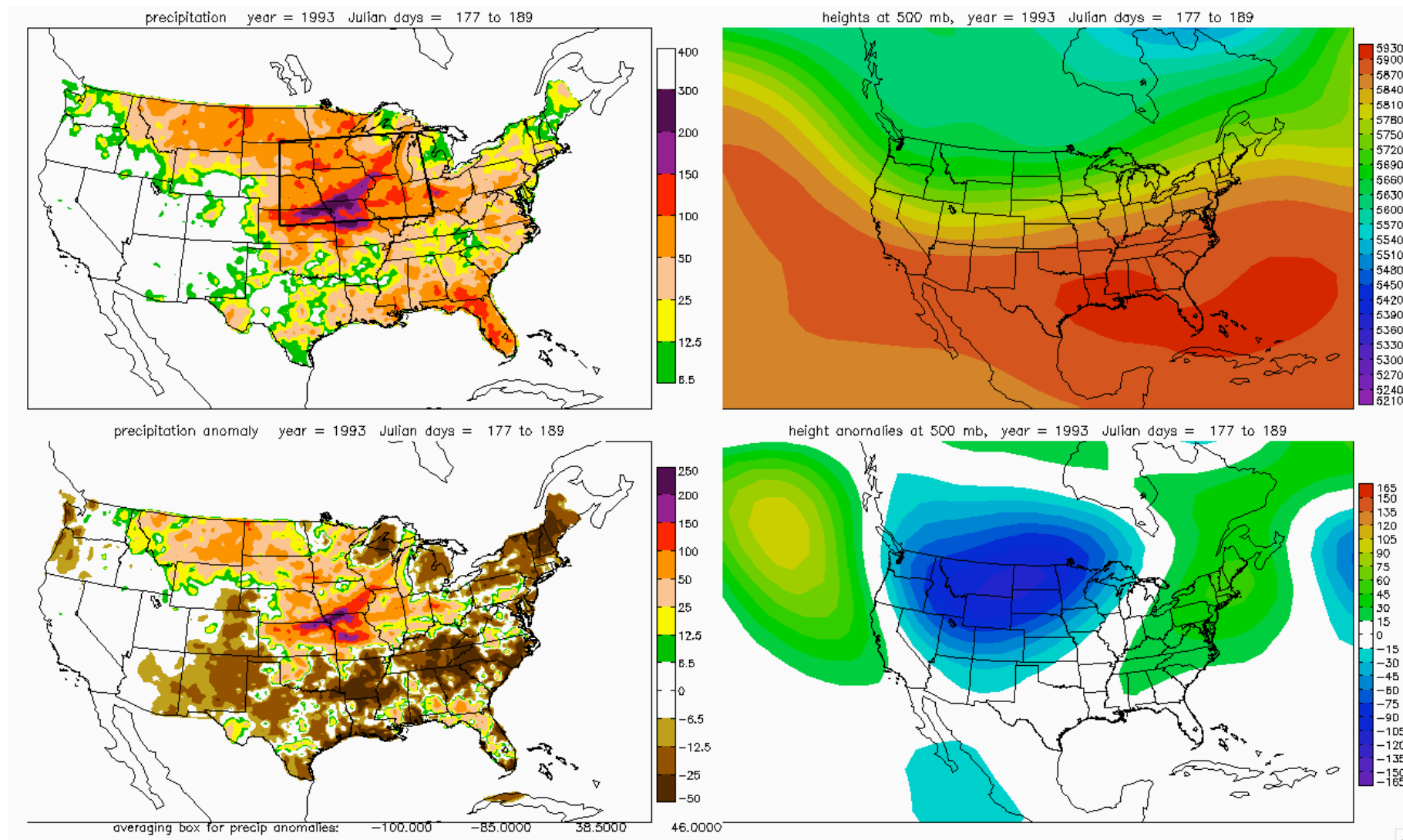
Backup Slides



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Midwest Floods

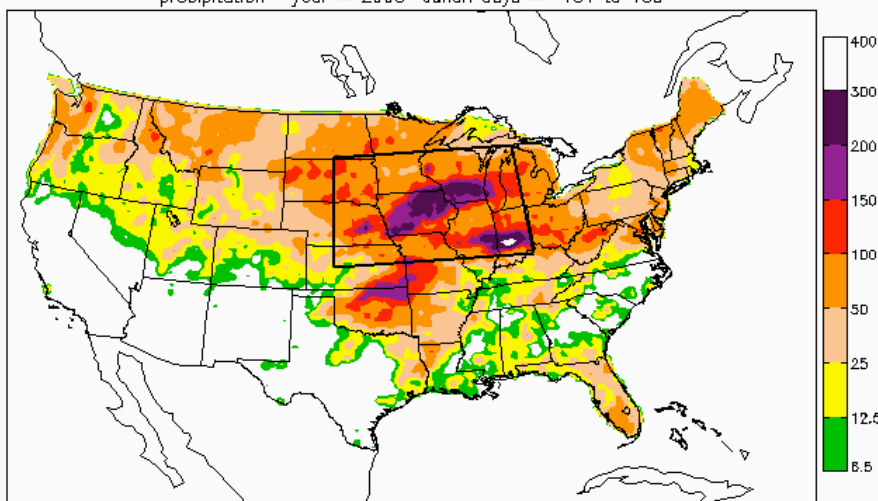
Precipitation and 500mb Heights—1993



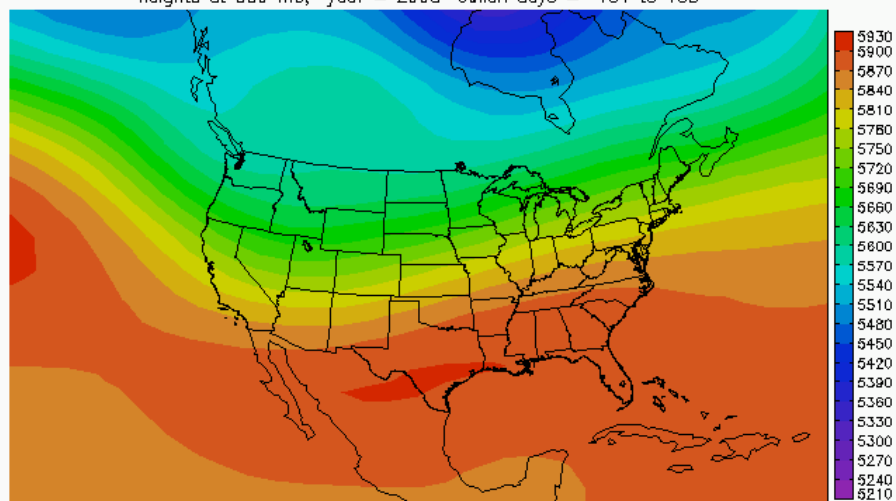
Midwest Floods

Precipitation and 500mb Heights—2008

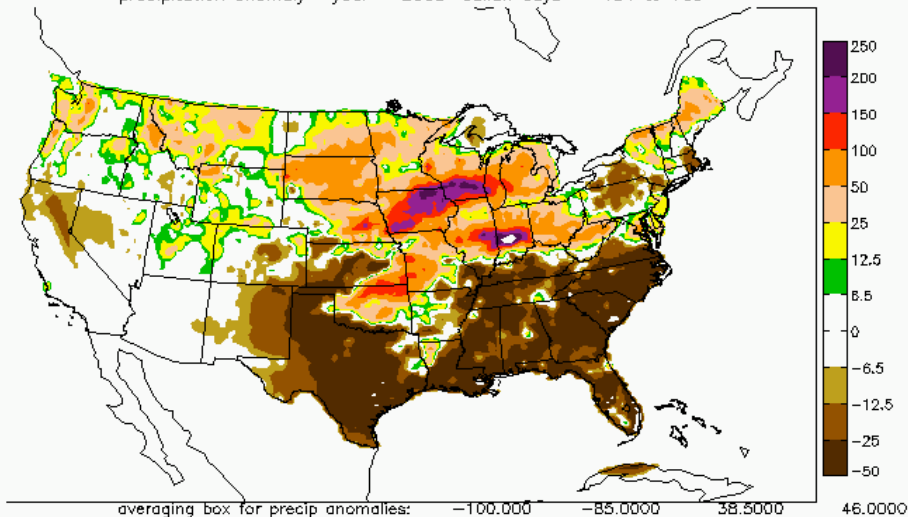
precipitation year = 2008 Julian days = 151 to 163



heights at 500 mb, year = 2008 Julian days = 151 to 163



precipitation anomaly year = 2008 Julian days = 151 to 163



height anomalies at 500 mb, year = 2008 Julian days = 151 to 163

